52. (Once amended) The recombinant microorganism as in claim 1, wherein a combination of sugars of the acceptor molecule and the one or more sugars transferred to the acceptor molecule by the exogenous glycosyltransferases make up the entirety of a mimic of a receptor for a toxin or adhesin of a pathogenic organism.

53. (Once amended) The recombinant microorganism as in claim 1, wherein the completed acceptor molecule has a terminal residue to which the exogenous glycosyltransferases transfer sugars to make up a mimic of a receptor for a toxin or adhesin of a pathogenic organism.

58. (Once amended) The recombinant microorganism as in claim 56, wherein said microorganism is selected from a genus selected from the group consisting of *Escherichia, Salmonella, Acidophilus, Lactobacillus, Lactococcus*, and *Bifidobacterium*.

60. (Once amended) The recombinant microorganism as in claim 1, wherein the microorganism is chosen by reason of having reduced production of external masking polysaccharide molecules other than said acceptor molecule to enhance exposure of a mimic of a receptor for a toxin or adhesin of a pathogenic organism.

61. (Once amended) The recombinant microorganism as in claim 60, wherein the microorganism has reduced production of external molecules selected from the group comprising a slime layer, capsule, or exopolysaccharide.

62. (Once amended) The recombinant microorganism as in claim 1, wherein the microorganism is selected to provide some resistance to antimicrobial activity of microflora potentially resident in the gut of the animal.

63. (Once amended) The recombinant microorganism as in claim 1, wherein the microorganism is resistant to a colicin from a major family of colicins.

64. (Once amended) The recombinant microorganism as in claim 1, wherein at least one glycosyltransferase is naturally occurring.

65. (Once amended) The recombinant microorganism as in claim 1, wherein genes encoding at least one glycosyltransferase is modified to stabilize phase variation.

66. (Once amended) A recombinant microorganism expressing one or more exogenous sugar transferases, or one or more exogenous nucleotide sugar precursor synthesizing enzymes, said microorganism also expressing an acceptor molecule, said one or more exogenous sugar transferases being specific for the transfer of one or more sugar residues represented progressively from a non reducing terminal end of a receptor of either a toxin or an adhesin of a pathogenic organism, the exogenous sugar transferases progressively transferring said one or more sugar resides onto the acceptor molecule to thereby form a chimeric carbohydrate molecule with an exposed receptor mimic, said sugar precursor enzymes forming nucleotide precursors that are transferred to said acceptor molecule to make up said chimeric carbohydrate, said exposed receptor mimic capable of binding the toxin or the adhesin.

67. (Once amended) A pharmaceutical preparation for administration to a mucosal surface, said preparation comprising a delivery microorganism or a partially or fully purified non-toxic preparation of a carbohydrate molecule therefrom, at least a part of said carbohydrate molecule acting as an exposed receptor mimic, said receptor mimic capable of binding a toxin or an adhesin of a pathogen that normally binds to said

mucosal surface, said pharmaceutical preparation being carried in a pharmaceutically acceptable excipient.

74. (Once amended) The pharmaceutical preparation as in claim 67, wherein one or more exogenous nucleotide sugar precursor synthesizing enzymes are also expressed by said delivery microorganism, said sugar precursor enzymes forming precursors to make up said chimeric carbohydrate.

75. (Once amended) The pharmaceutical preparation as in claim 67, wherein genes encoding at least one glycosyltransferase is modified to prevent phase variation.

79. (Once amended) The pharmaceutical preparation as in claim 78, wherein the delivery microorganism is selected to provide some resistance to antimicrobial activity of microflora potentially resident in the gastrointestinal mucosal surface.

80. (Once amended) The pharmaceutical preparation as in claim 79, wherein the delivery microorganism is resistant to a colicin from a major family of colicins.

83. (Once amended) The pharmaceutical preparation as in claim 82, wherein the delivery microorganism belongs to an enteric genera selected from the group consisting of *Escherichia, Salmonella, Acidophilus, Lactobacillus, Lactococcus, Streptococcus*, and *Bifidobacterium*.

84. (Once amended) The pharmaceutical preparation as in claim 67, wherein the delivery microorganism is killed before administration of the pharmaceutical preparation.

89. (Once amended) The method of administering the receptor mimic as in claim 88, wherein the delivery microorganism is a recombinant microorganism expressing one or more exogenous sugar transferases and an acceptor molecule, said one or more exogenous sugar transferases being specific for transfer of one or more sugar residues represented progressively from a non reducing terminal end of a receptor of either a toxin or an adhesin of a pathogenic organism, the exogenous sugar transferases progressively transferring said one or more sugar resides onto the acceptor molecule to thereby form a chimeric carbohydrate molecule with the exposed receptor mimic being exposed, said exposed receptor mimic capable of binding the toxin or the adhesin.

90. (Once amended) The method of administering the receptor mimic as in claim 88, wherein the receptor mimic is a mimic of the receptor of a toxin.

97. (Once amended) The method of administering the receptor mimic as in claim 88, wherein one or more exogenous nucleotide sugar precursor synthesizing enzymes are also expressed by said delivery microorganism, said sugar precursor enzymes forming precursors to make up said chimeric carbohydrate.

98. (Once amended) The method of administering the receptor mimic as in claim 88, wherein the delivery microorganism is non harmful and live.

99. (Once amended) The method of administering the receptor mimic as in claim 88, wherein the administration is enterally.

100. (Once amended) The method of administering the receptor mimic as in claim 99, wherein the delivery microorganism is protected by a protective capsule or held within a protective matrix.

101. (Once amended) The method of administering the receptor mimic as in claim 99, wherein the delivery microorganism is selected to provide some resistance to antimicrobial activity of microflora potentially resident in the gut of the mammal.

102. (Once amended) The method of administering the receptor mimic as in claim 99, wherein the delivery microorganism is resistant to a colicin from a major family of colicins.

103. (Once amended) The method of administering the receptor mimic as in claim 99, wherein the delivery microorganism is grown under conditions to induce acid tolerance.

104. (Once amended) The method of administering the receptor mimic as in claim 99, wherein the delivery microorganism is enteric.

105. (Once amended) The method of administering the receptor mimic as in claim 104, wherein the delivery microorganism is belongs to an enteric genera selected from the group consisting of Escherichia, Salmonella, Acidophilus, Lactobacillus, Lactococcus, and Bifidobacterium.

106. (Once amended) The method of administering the receptor mimic as in claim 88, wherein the delivery microorganism is killed before administration to the mammal.

107. (Once amended) The method of administering the receptor mimic as in claim 106, wherein the delivery microorganism is killed by treatment with a chemical agent selected from the group consisting of formalin or thiomersal, or a bactericidal antibiotic, or by exposure to heat or to UV irradiation.

110. (Once amended) The method of administering the receptor mimic as in claim 88, wherein the receptor mimic is that of a porcine rotavirus or shiga like toxin active in pigs, comprising the step of adding the delivery microorganism to pig feed or drink.

117. (New) A recombinant *E. coli* that displays on its surface a binding moiety that, when administered to an animal, competes with a ligand for binding to a receptor for the ligand, wherein the binding moiety comprises an oligosaccharide which comprises a sugar residue that is attached to an acceptor moiety by a glycosyltransferase that is encoded by an exogenous nucleic acid which is present in the microorganism.

118. (New) The recombinant *E. coli* of claim 117, wherein the oligosaccharide is Galα[1→4]Galβ[1→4]Glc.

119. (New) The recombinant *E. coli* of claim 117, wherein the oligosaccharide is GalNAcβ[1→3]Galα[1→4]Galβ[1→4]Glc.

IN THE ABSTRACT:

Chimeric carbohydrates produced by recombinant microorganism carrying exogenous glycosyltransferases act with or without exogenous enzymes required for synthesis or nucleotide synthesis precursors. These recombinant microorganism can be used for competitively inhibiting the binding of toxins or adhesins to receptors of mucosal surfaces, especially gastrointestinal surface. In particular chimeric sugar moieties have been made for lipopolysaccharides, in recombinant microorganism that present multiple copies of the oligosaccharides. The oligosaccharide moieties so presented act as receptor mimic for toxins and adhesins. A number have been